RESEARCH NOTE

Northern Rocky Mountain Forest & Range Experiment Station

Missoula, Montana

No. 3 February 1940

EARLY EFFECTS OF THINNING PURE PONDEROSA PINE IN WESTERN MONTANA

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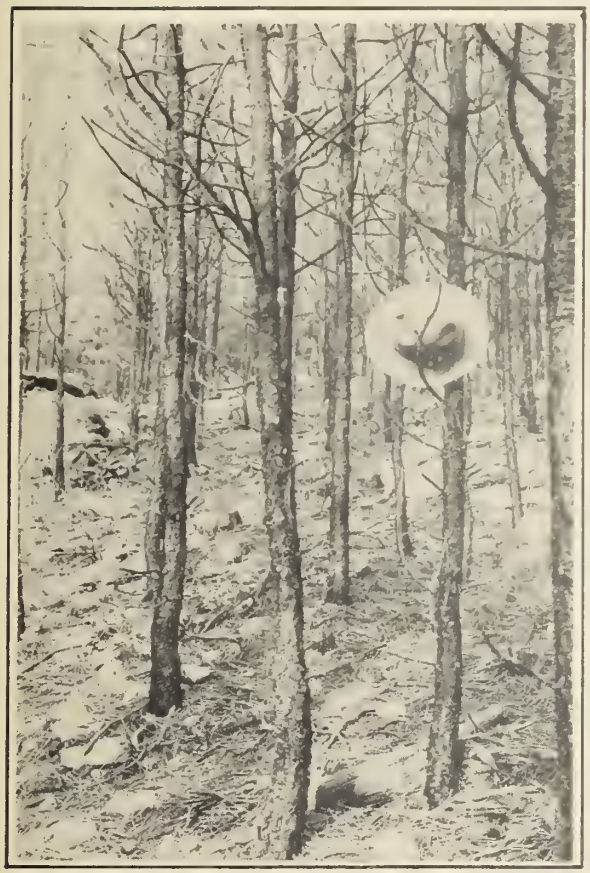
Just as the gardener thins his carrots and the farmer thins sugar beets to give those remaining greater space for development, so does the forester often need to thin forest stands to harvest trees which would ordinarily die and to increase rate of growth on the trees he selects to leave, thus enhancing the value of the stand. An indication of what may be expected after thinning young ponderosa pine in western Montana is given by data obtained from the fifth-year examination of nine experimental thinning plots in the Lolo National Forest near Missoula. In these plots, established during the summer of 1935, treatment had a measurable effect during the 5-year period. All thinnings were from below, i.e., removing the overtopped trees of small crowns and poor form first and working upward in consecutive order through the fair to better crown trees, increasing the number removed with increase in intensity of thinning (see plate 1). The plots, ranging in area from 0.1 to 0.4 acre, consist of two groups. One group, including four plots, is on a site of fair quality (site quality class IV) and the other, including five plots, is on a poor quality site (site quality VI). Treatment of each plot within these groups was as follows:

Group I, Fair Quality Site

Plot 604	Lightly thinned
" 605	Moderately thinned
" 606	Heavily thinned
" 607	Unthinned check

A. Unthinned stand of ponderosa pine (Plot 613)



B. Lightly thinned from below (Plot 609)

C. Heavily thinned from below (Plot 612)

Plate 1. Thinnings from below in 45-50 year old stands of pure ponderosa pine, near Missoula, Montana, Lolo National Forest.

Group II, Poor Quality Site

Plot 609	Lightly thinned
" 610	" "
" 611	Heavily thinned
" 612	" "
" 613	Unthinned check

In each group the unthinned plot serves as a check for each of the thinned plots. It was marked as if it were to be thinned according to the various intensities of thinning within the group and the trees which would have been left had it been thinned to each intensity were recorded. This procedure enables comparisons of growth to be made between comparable trees on thinned and unthinned plots. These comparisons are shown in table 1, which gives summary data for the plots.

Beetles have caused some mortality during the 5-year period on plots of group I, especially on plot 607. Mortality from other causes has been much less on thinned plots of both groups than on comparable unthinned plots. This fact is significant only in showing that thinning removed most of the trees which would ordinarily have died.

Diameter growth comparisons are probably the best criteria, at the present time, of treatment effects. Although the data contain minor inconsistencies, they show that thinning has stimulated diameter growth, and that diameter increase has been favored more by heavy thinnings than by light.

Basal area growth, as would be expected, shows the same trend as that shown by diameter growth. No consistent effect of thinning on height growth could be detected.

In addition to the measured effects of thinning, increased stand vigor was evidenced by the appearance of individual trees. In the heavily thinned plots the crowns were larger, thicker, and deeper green in color. Comparisons with marked trees on the check plots showed that all of these differences could by no means be ascribed to the fact that only the better trees were left on the thinned plots. On the heavily thinned plots it appeared that some trees might become "wolfish" before the stand could close sufficiently to shade the lower branches. Such a tendency will require a number of years, however, to become marked.

Although favorable, the observed effects of thinning during this 5-year period do not alone spell success. The stimulus given by this one thinning may be short lived lasting only until crowns close. It is almost axiomatic that for thinnings to be really effective they must be made frequently; the ideal practice in thinning is to start early in the life of the stand and to return often. This can seldom be done and still make returns balance costs unless the material removed in thinning can be marketed. Though marketing of this material is not often possible under present utilization and the market conditions in western Montana, local use of thinning material, especially for firewood, seems likely to increase. The future should find increasing use for these silvicultural methods.

Table 1.--Five-year effects of different intensities of thinning from below in pure ponderosa pine

Intensity of thinning	Plot numbers	Number of trees per acre: 1933: Before thinning	1933: After thinning	1938	D.B.H. of average tree in 1933 after thinning	D.B.H. growth of average tree, 1933-1938	Basal area growth percent per year, 1933-1938
GROUP I, FAIR QUALITY SITE		Number	Number	Number	Inches	Inches	Percent
Light	604	2,647	973	853	4.7	0.40	0.46
	607 (check 1/)	2,227	960	700	4.7	0.25	2/
Moderate	605	2,205	835	775	4.9	0.26	1.02
	607 (check 1/)	2,227	800	573	4.9	0.26	2/
Heavy	606	2,678	425	420	5.8	0.56	3.78
	607 (check 1/)	2,227	540	387	5.2	0.31	2/
Unthinned	607 (all trees)	2,227	2,227	1,500	3.8	0.17	2/
GROUP II, POOR QUALITY SITE							
Light	609	3,933	1,707	1,700	3.3	0.20	2.62
	610	5,100	1,993	1,993	2.9	0.17	2.48
	613 (check 1/)	6,930	1,990	1,990	2.8	0.13	2.12
Heavy	611	3,760	753	747	3.9	0.34	3.46
	612	4,353	900	900	3.5	0.38	4.52
	613 (check 1/)	6,930	1,050	1,050	3.2	0.16	2.14
Unthinned	613 (all trees)	6,930	6,930	6,150	1.8	0.09	1.48

1/ Comparable trees on the unthinned check plot, including for each intensity of thinning only those trees which would have been left had the plot been thinned to that intensity.

2/ Values not computed because of mortality in part of the plot by infestation of beetles.